

REMARKS

This amendment responds to the Office Action mailed December 28, 2004. All of the issues raised by the Examiner in that action are addressed below.

Claim Rejections – 35 USC 103

The Examiner rejected claims 1 and 24-29 under 35 USC 103(a) as obvious in light of Friemann (US Patent 3,858,095) in view of Hughes (US Patent 5,081,406) and Hokodate et al. (US Patent 6,150,826). Those rejections are traversed.

Claim 1 describes a method of detecting accidental contact between a person and a dangerous portion of a woodworking machine. The method provides a first electrode coupled to a person and a second electrode coupled to the dangerous portion of the machine. A signal is transmitted by one of the electrodes to the other and the signal is sampled a plurality of times within 200 microseconds to determine if the signal has a predetermined characteristic indicative of contact with a person.

The limitation of sampling the signal within 200 microseconds is one of the limitations that distinguishes claim 1 from the cited references. This limitation addresses the fact that the dangerous portion of a woodworking machine may be a toothed blade, and in the event of an accident, the teeth of the blade will be in contact with a person intermittently because of the gullets between the teeth. Sampling the signal within 200 microseconds means that the method will likely detect contact as the first tooth cuts into the person because 200 microseconds is the approximate time it would take one tooth of a 10" circular saw blade spinning at approximately 4000 rpm to travel ½ inch, which is about the width of a finger. Additionally, sampling the signal a plurality of times within 200 microseconds allows the method to check and re-check for contact as the first tooth

cuts into the person. This makes the method more robust and helps insure the method detects contact, even intermittent contact with the teeth of a spinning blade.

Nothing in any cited reference discusses sampling a signal a plurality of times within 200 microseconds to detect contact. Nevertheless, the Examiner says claim 1 is obvious because Friemann discloses a woodworking machine with a contact detection system and Hokodate discloses sampling a signal generally. The Examiner says it would have been obvious to sample a plurality of times within 200 microseconds in light of Hokodate's general disclosure of sampling "since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art." (Office Action, 4.)

The limitation in question, however, is not simply a "result effective variable" that can be optimized by the use of routine skill in the art. A "result effective variable" is "a variable which achieves a recognized result." MPEP 2144.05 (II.)(B.). In the case at hand, there is no indication in any cited reference that determining whether a signal has a predetermined characteristic indicative of contact is a recognized result. Furthermore, the cited references clearly fail to identify any variable that may be set to optimize detection of contact between a person and the dangerous portion. Thus, the limitation at issue is not a "result effective variable." To the contrary, the limitation in question addresses the unique situation of a person coming into contact, and potentially intermittent contact, with a dangerous portion of a woodworking machine. The limitation was developed through study and experimentation; not through the simple application of routine skill in the art.

In fact, the Hokodate reference teaches away from sampling a signal a plurality of times within 200 microseconds to detect contact. Hokodate discloses a distance detector for a laser beam cutting machine. The distance detector is used to measure the focal point or nozzle height of the laser above a workpiece without regard to plasma or sputter generated during laser machining. The distance detector includes a sensing electrode positioned adjacent a workpiece, and the capacitance between the electrode and the workpiece is used to determine the desired distance. (Hokodate, column 3, line 48 to column 4, line 8.) In one embodiment, the distance is determined by a phase shifting circuit 17 and a sampling circuit 20. (Column 11, lines 50-51.) The sampling circuit "samples the detection output of the detecting circuit 8 at a fixed period, on the basis of the information of the output of the voltage source 15 that has been made in-phase by the phase shifting circuit 17." (Column 11, lines 57-60.) In this manner, "the sampling circuit 20 samples only a portion of desired phase, e.g. a portion of a phase having large amplitude at a fixed period, from a voltage detected by the detecting circuit 8. In other words, the sampling circuit 20 samples only a portion having a large SN ratio." (Column 12, lines 1-5.)

Hokodate teaches away from sampling a signal a plurality of times within 200 microseconds by instead sampling a signal based on the output of a voltage source that has been made in phase by a phase shifting circuit. Hokodate samples at a fixed period based on phase in order to sample a portion of the signal having a large signal-to-noise ratio, and having a large signal-to-noise ratio is one way Hokodate eliminates noise resulting from plasma or sputtering during machining. Thus, Hokodate not only fails to suggest the limitation of claim 1, it teaches away from the limitation.

If Hokodate were modified to sample as set forth in claim 1, then Hokodate would no longer function as intended because it would no longer sample the portion of the signal having a large signal-to-noise ratio and therefore would not overcome noise from plasma or sputtering. Because Hokodate would no longer function as intended if it were modified to sample as required by claim 1, Hokodate cannot provide a suggestion or motivation to combine the cited references. MPEP 2143.01 ("the proposed modification cannot render the prior art unsatisfactory for its intended purpose"). Additionally, modifying Hokodate to sample as set forth in claim 1 would change its principle of operation from sampling based on phase to sampling a plurality of times within 200 microseconds, and therefore Hokodate cannot render claim 1 obvious. MPEP 2143.01 ("the proposed modification cannot change the principle of operation of a reference").

In any event, in order to establish obviousness, "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." MPEP §2143. There clearly is no such suggestion in Hokodate or Friemann because neither reference discusses sampling a signal a plurality of times within 200 microseconds - neither reference even mentions a reason to do so.

Applicant also points out that Hokodate should not even be considered in an obviousness inquiry because it is non-analogous art and therefore outside the proper scope and content of the art. MPEP §2141.01(a). Hokodate is non-analogous art because it is outside the field of applicant's endeavor, i.e. safety systems for woodworking machines, and because it is not reasonably pertinent to the particular problem addressed by the pending claims, namely, detecting accidental contact

between a person and a dangerous portion of a woodworking machine. MPEP §2141.01(a). Instead, Hokodate discloses a distance detector for laser cutting and machining equipment.

Claim 1 also includes other limitations that are not disclosed in any of the cited references, and therefore, the cited references cannot render claim 1 obvious. MPEP 2143.03 ("To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.") Specifically, none of the cited references discloses the limitations of providing a first electrode electrically coupled to a person and a second electrode coupled to the dangerous portion of the machine. The Examiner, however, says that the Friemann reference discloses those limitations because a capacitance is altered when a person contacts the blade in Friemann. In other words, the Examiner equates contact between the person and the blade in Friemann with the step of providing a first electrode coupled to a person. (Office Action, 3.) Applicant disagrees. The plain meaning of the limitations in claim 1 is to provide a first electrode coupled to a person and a second electrode coupled to the dangerous portion of the machine and nothing in Friemann discloses those limitations.

Claims 24-28 depend from claim 1 and are not obvious for the same reasons that claim 1 is not obvious. Those claims also include additional limitations that further distinguish the cited references.

Claim 29 is an independent claim that includes a number of limitations that are neither taught nor suggested by the cited references. Specifically, claim 29 recites "providing a first electrode electrically coupled to the person" and that limitation is neither taught nor suggested by the cited references, as discussed above. The claim

also recites "providing a second electrode electrically coupled to the dangerous portion," "transmitting a signal by one of the first or second electrodes," and "receiving the transmitted signal by the other of the first or second electrodes." None of the cited references transmit a signal between an electrode coupled to a person and an electrode coupled to the dangerous portion. Finally, claim 29 recites "performing a step of sampling the signal a plurality of times to determine if the signal has at least one predetermined characteristic indicative of contact between a person and the dangerous portion." As explained above, nothing in the cited references teaches or suggests sampling a signal a plurality of times to detect contact between a person and the dangerous portion of a woodworking machine.

CONCLUSION

For the reasons given above, the currently pending claims are not obvious in light of the cited references, and therefore, the obviousness rejections should be withdrawn and the application should proceed to issuance.

Respectfully submitted,

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